

What is claimed is:

[Claim 1] 1. A method of sputter deposition, comprising:

providing a sputter target having a back surface and an exposed front surface;
providing a source of magnetic field lines, said magnetic field lines extending through said sputter target from said back surface to said exposed front surface of said sputter target; and
providing one or more pole extenders between magnetic poles of said source of said magnetic field lines and said exposed front surface of said sputter target.

[Claim 2] 2. The method of claim 1, further including:

positioning said one or more pole extenders to increase a distance said magnetic field lines extend from said magnetic poles of said magnetic source in a direction of said exposed front surface of said sputter target.

[Claim 3] 3. The method of claim 1, further including:

positioning said one or more pole extenders to increase lengths of magnetic field lines that are parallel to said exposed surface of said sputter target.

[Claim 4] 4. The method of claim 1, wherein said one or more pole extenders are contained within said sputter target.

[Claim 5] 5. The method of claim 1, further including:

providing a backing plate having a back surface and a front surface, said front surface of said backing in direct physical contact with said back surface of said sputter target.

[Claim 6] 6. The method of claim 5, wherein said one or more pole extenders are contained within said backing plate.

[Claim 7] 7. The method of claim 5, wherein first portions of each of said one or more pole extenders are contained within said sputtering target and second corresponding and integral portions of said one or more pole extenders are contained within said backing plate.

[Claim 8] 8. The method of claim 1, wherein said sputter target is a disk and said one or more pole extenders are rings, disks or a combination of rings and disks.

[Claim 9] 9. The method of claim 8, further including:

centering said one or more pole extenders about an axis perpendicular to said back surface of said sputter target and running through the geometric center of said sputter target.

[Claim 10] 10. The method of claim 1, wherein surfaces of said one or more pole extenders adjacent to said front exposed surface of said sputter target are independently selected from the group consisting of flat surfaces, curved surfaces, slanted surfaces, pointed surfaces and combinations thereof.

[Claim 11] 11. The method of claim 1, wherein said one or more pole extenders comprise material independently selected from the group consisting of iron, iron alloys, cobalt and other electrically conductive magnetic materials.

[Claim 12] 12. The method of claim 1, wherein said sputter target comprises material selected from the group consisting of copper, tantalum, aluminum, platinum, cobalt, gold, titanium, tungsten, other refractory metals, other

electrically conductive materials and alloys thereof, silicon oxide, aluminum oxide, tantalum oxide, other metal oxides and other dielectrics.

[Claim 13] 13. The method of claim 1, further including:

coating said one or more pole extenders with an anti-chemical or an anti-galvanic corrosion layer.

[Claim 14] 14. The method of claim 1, wherein said source of said magnetic field lines is one or more rotating permanent magnets.

[Claim 15] 15. The method of claim 14, wherein said rotating permanent magnets rotate about an axis of rotation that is parallel to and offset from an axis perpendicular to said back surface of said sputter target and running through the geometric center of said sputter target.

[Claim 16] 16. An apparatus, comprising:

a sputter target having a back surface and an exposed front surface;
a source of magnetic field lines, said magnetic field lines extending through said sputter target from said back surface to said exposed front surface of said sputter target; and
one or more pole extenders between magnetic poles of a source of said magnetic field lines and said exposed front surface of said sputter target.

[Claim 17] 17. The apparatus of claim 16, further including:

said one or more pole extenders positioned to increase a distance said magnetic field lines extend from said magnetic poles of said magnetic source in a direction of said exposed front surface of said sputter target.

[Claim 18] 18. The apparatus of claim 16, further including:

said one or more pole extenders positioned to increase lengths of magnetic field lines that are parallel to said exposed surface of said sputter target.

[Claim 19] 19. The apparatus of claim 16, wherein said one or more pole extenders are contained within said sputter target.

[Claim 20] 20. The apparatus of claim 16, further including:

a backing plate having a back surface and a front surface, said front surface of said backing in direct physical contact with said back surface of said sputter target.

[Claim 21] 21. The apparatus of claim 20, wherein said one or more pole extenders are contained within said backing plate.

[Claim 22] 22. The apparatus of claim 20, wherein first portions of each of said one or more pole extenders are contained within said sputtering target and second corresponding and integral portions of said one or more pole extenders are contained within said backing plate.

[Claim 23] 23. The apparatus of claim 16, wherein said sputter target is a disk and said one or more pole extenders are rings, disks or a combination of rings and disks.

[Claim 24] 24. The apparatus of claim 23, further including:

said one or more pole extenders centered about an axis perpendicular to said back surface of said sputter target and running through the geometric center of said sputter target.

[Claim 25] 25. The apparatus of claim 16, wherein surfaces of said one or more pole extenders adjacent to said front exposed surface of said sputter target are independently selected from the group consisting of flat surfaces, curved surfaces, slanted surfaces, pointed surfaces and combinations thereof.

[Claim 26] 26. The apparatus of claim 16, wherein said one or more pole extenders comprise material independently selected from the group consisting of iron, iron alloys, cobalt and other electrically conductive magnetic materials.

[Claim 27] 27. The apparatus of claim 16, wherein said sputter target comprises material selected from the group consisting of copper, tantalum, aluminum, platinum, cobalt, gold, titanium, tungsten, other refractory metals, other electrically conductive materials and alloys thereof, silicon oxide, aluminum oxide, tantalum oxide, other metal oxides and other dielectrics.

[Claim 28] 28. The apparatus of claim of claim 16, further including:

an anti-chemical or an anti-galvanic corrosion layer coating said one or more pole extenders.

[Claim 29] 29. The apparatus of claim 15, wherein said source of said magnetic field lines is one or more rotating permanent magnets.

[Claim 30] 30. The apparatus of claim 29, wherein said rotating permanent magnets are adapted to rotate about an axis of rotation that is parallel to and offset from an axis perpendicular to said back surface of said sputter target and running through the geometric center of said sputter target.